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Comparison of Relative Costs of Production in the Bloc and the West for Selected Commodity Categories on the International Export Control Lists

The conclusions described below should be considered preliminary and subject to much more exhaustive research than has been possible within the time of the request. Since available intelligence for some areas of the Bloc economy is more complete than for others, the degree of confidence to be placed in the conclusions varies. The following discussion is consequently divided into two parts: those commodity groups about which relative cost information is reasonably certain, although preliminary, are separated from those commodity groups for which conclusions about relative cost are based on less than adequate evidence. For those commodity groups not mentioned not even a priori deductions about relative costs are possible.

It should be remembered that even within those commodity groups showing average or low relative costs of production, any particular commodity item which may be a prototype, embodying advanced technology not employed in the USSR, should be viewed as one of relatively high costs. Many items on the control list may be of this nature.

A. Reasonably Certain Conclusions.

1. Commodities of high production costs in the Bloc as compared to the US:

Coaxial Cable (1525)

Magnetic Materials (1631)

Aluminum (1636)

Cobalt (1648)

Columbium (1649)

Copper (1650)*

Mercury (1655)

Molybdenum (1659)

Nickel (1661)

Bismuth (3641)

* See Appendix II.

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For the above materials Bloc prices are high as compared with western prices, and Bloc costs (on the Western definition) are believed to be at least equal to prices. High Bloc costs are to be explained in terms of low quality ores, inconvenient geographic locations, a low rate of capital equipment in relation to labor, and a relatively inefficient use of machinery.

2. Commodities of average costs in the Bloc as compared with the US:

Petroleum products*

Low-carbon ferro-chrome (3640)

Heavy (basic) chemicals (phenol 3753)

The petroleum and chemical industries in the Bloc are modern and well-equipped. The products on which they concentrate are produced as efficiently as in the US. Both the range of petroleum products produced in bulk and technique of production in the Bloc are the equivalent of that in the US, with perhaps some lag in Bloc technology in refining aviation gasolines.* On the other hand, until recently Bloc efforts have been concentrated on the production of the basic chemicals; the specialty chemicals, of more complex processes, have only recently come into production and in this sphere Bloc technology appears to lag behind the US, Bloc costs to be high as compared with US costs.*

B. Very Preliminary Conclusions (based on less than adequate evidence)

The following conclusions are based primarily on price information, with little knowledge of Bloc costs against which to test price ratios.

1. Commodities of probably high production costs in the Bloc as compared with the US:

Chemicals other than basic chemicals. (1735 hydrogen peroxide 2754 toluol 3715 borax**)

Alloys carrying specified percentages of molybdenum, cobalt, columbium, tantalum and nickel. (1635)

Aviation gasoline*** (1773)

Precision bearings**** (1601)

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* See B-1.
** See Appendix I
*** See A-2 above.
**** See B-3 below.

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Seamless steel drill pipe (1154)

2. Commodities of probably average production costs in the Bloc as compared with the US:

Communication and locating equipment*

Electronic components*

Measuring and testing equipment*

Electrical and Power generating equipment*

Trucks (1490)

Steel Blooming Mill**

Barium Nitrate (1713)

Boric Acid (3715)***

Welded or seamless Steel line pipe (3154 and 3154)

3. Commodities of Probably low production costs in the Bloc as compared with the US:

Horizontal Boring Mills, 75 & 95 mm (2002)****

Antifriction bearings***** (1601)

* Many items not on the control list are included in these groups; specific commodities on the control list in these groups may be of high relative cost.
** See Appendix IV.
*** See Appendix I.
**** See Appendix III for other machine tools on the control list available evidence is insufficient even for a guess.
***** See B-1 above.

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Methodology

In order to estimate the economic benefits which the Bloc does, or would, derive from East-West trade in various commodity groups, it would be most desirable to compare production costs in that Bloc country which is the lowest cost producer in the group with costs of the low-cost producer in the West. Intelligence relating to Bloc costs of production, however, is very scarce, spotty in coverage and in most cases qualitative rather than quantitative in nature. Existing information of various kinds has been drawn upon in this survey. Where information on relative prices exists, it has been used in the absence of cost data, if there were any supplementary knowledge indicating that, on the whole, the price of this commodity in the Bloc is closely related to cost. If, for example, a ruble-dollar price ratio indicated that commodity X is of high relative price in the Bloc, and if it is believed that cost is at least equal to price, then it follows that relative costs must be high also. Or again, if the price ratio is low, (or average) if this industry is an established industry using mass production techniques to turn out commodities of good quality, if there is no evidence of subsidies, then it can be deduced that this is a commodity of low (or average) relative costs. If the commodity in question is one which embodies advanced technology in the West, and if it is not produced in the USSR, by definition it would be of high relative cost because of the research and development expenses which the Bloc would have to incur to produce it.

Existing price information relates almost entirely to the year 1959, both for ruble prices and dollar prices. In assigning commodities to cost categories price movements since 1959 have been considered; since only little is known about current prices in the Bloc, however, the resulting margin of error may be sizable. Only three broad categories of cost, therefore, are justified, a more precise ranking is not possible.

Cost information on machinery items in particular is not only difficult to obtain, but even when once obtained, whether cost data for the US and USSR are comparable depends on the components of cost in each case as well as on the comparability of the items whose cost is being compared. A machine typically constructed on contract to do a specific job in a specific location is likely to be different in some regard from every other similar machine custom-produced. Moreover,

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such equipment is most often produced in plants which turn out a variety of products. In these cases the apportionment of overhead is always somewhat arbitrary and such practice may vary among producers in the US as well as between US and USSR producers. Such ambiguities in the meaning of cost, as well as in the relation of prices to costs, which are still unresolved, imply that conclusions about the relative costs of production of most machinery items are only informed guesses, highly tentative, and subject to considerable change with further research.

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ppendix I: Borax

Borax can be deduced to be a commodity of very high production costs in the B oc as compared with the West. An exceptionally high ruble-dollar price ratio ($1:1 for borax, as compared with $0:1 for boric acid which is about equal to the average of commodity production) is explained at least in part by the difference in methods of manufacture in the US and USSR. In the US borax is recovered directly from the mineral kernite or from the borax-containing brine of Searles Lake, California. In the USSR the only known present method of manufacture consists of first obtaining boric acid from the borate minerals and then reacting the boric acid with soda. Thus in the USSR borax is an end product, boric acid a raw material, whereas the opposite is the case in the US. Such additional processing apparently would result in a considerably higher relative cost of borax in the USSR. It is probably necessitated by the lower quality of the borax-containing mineral deposits in the Bloc, but may also reflect a failure on the part of Soviet technologists to apply successfully the techniques of "phase-rule" engineering.

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Appendix II: Copper and Copper Wire

Production of copper in the USSR, which appears to be the lowest cost producer in the Bloc, is of high relative cost compared with the US for three reasons: (1) the nature of copper mining operations in USSR compared to the US (2) the lesser quantity and quality of machinery used (3) the lower efficiency with which machinery is used. In addition, copper costs in the USSR would be high relative to costs in the lowest-cost producers in the West (Chile and Rhodesia) because of the lower quality of the USSR copper deposits. On the average in the US 100 tons of ore must be processed to obtain one ton of metal; in the USSR only about 90 tons are required per ton of metal. US ores, however are of fairly low quality. In Rhodesia only about 40 tons of ore would be required for one ton of metal, while in Chile about 50 tons of ore would yield one ton of metal.

(1) The process of mining copper in the USSR imposes higher costs on Soviet copper production than is the case in the US, because copper mining requires primarily difficult underground operations in the USSR as compared with primarily open-pit operations in the US. The Soviet Union has only one sizeable open-pit mine; well over one half of Soviet copper output is based on the more costly underground operations.

(2) While the Soviet Union does not lag behind the West in technological knowledge relating to the mining and processing of copper ores, it does lag behind the West in the application of this technology. Both open-pit and underground operations are less mechanized in the Soviet Union and many of the machine types currently used in the USSR are obsolete by US standards. In general, more labor and capital is used per unit of output in the USSR than in the West.

(3) Not only is somewhat outmoded equipment used in the USSR, but in addition the efficiency with which this machinery is operated and maintained is lower than in the West. Metal recovery from ore is lower by 5 or 10 percent.

Thus, the comparison of primarily underground operations in USSR against open-pit operations in the US, the fact of inferior quantity and quality of the machinery used and the lower efficiency with which it is used, support the conclusion that copper is an industry of high relative cost in the USSR.

Because of high material costs, costs of producing copper wire in the Soviet Union are likely to be high in relation to costs in the West. Also a higher rate

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of rejects (poorer quality control) contributes to higher relative USSR costs. The USSR is currently experiencing a shortage of wire-mill equipment which probably will be alleviated, at least in part, by imports from East Germany. Apart from the cost of copper, however, and poorer quality control, there is no other apparent reason for production costs of copper wire to be relatively high.

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ppendix III: Horizontal Boring Machines

Very recent information suggests that horizontal boring mills are produced in the USSR as efficiently as the average of Soviet machine tool output. For the machinery items in which they have concentrated, costs and prices both have fallen by about 20 percent over the past 5 years. Even in 1959, however, when Soviet prices were considerably higher than they are currently, ruble-dollar price ratios for machine tool items were among the lowest for all commodity productions.

Currently 63 and 200 mm. models of horizontal boring mills are estimated to bear price ratios in the range of 3 to 5 rubles to one dollar. Thus, even if price in the Soviet Union is only one-half of cost, which presumption seems most unlikely, horizontal boring mills are produced at no more than average relative costs, and it is more probable that they are of low relative cost.

For the most advanced types of machine tools, including the larger models of horizontal boring mills, we have no price or cost information. Moreover, available intelligence lacks a complete description of many Soviet models of machine tools, thus making comparison with US models, at least in part, somewhat arbitrary. Even where complete specifications of Soviet models are available, Soviet machines are often different in important details from US or other Western counter-parts.

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Appendix IV: Rolling Mills

Not only is information on both prices and costs for Soviet rolling mill equipment virtually non-existent, but the problem of comparing these custom-manufactured items is complex. For the following major categories of ferrous and non-ferrous rolling mills no data are available: hot and cold continuous sheet and strip, bar, rod, pipe, wheel, wire, rail-structural, plate and temper mills.

In the remaining category of bloom, billet, and slab mills a crude comparison of 1950 ruble and dollar prices indicates a price ratio in the range of average relative prices. The mill for which a ruble price is available is a 40 inch, two high, reversing blooming mill weighing 4496 metric tons. This price ratio is about the same as that for general industrial equipment (USSR product-mix), as would be expected in view of the successful results in blooming mill construction achieved by the Soviet machine builders. Since there is no evidence of subsidies, it can be tentatively concluded that blooming mills are of average cost in the Bloc as compared with the West.

On the other hand, it can be deduced that other types of rolling mills would be at least of somewhat higher relative costs in the Bloc. The West has had far greater experience in constructing both hot and cold continuous strip mills, which entail very complex production techniques. These and some other types of rolling mills have only recently come into production in the Bloc, not all those which have been produced embody the degree of advanced technology found in Western equipment. This latter would be especially true of cold rolled mills for which sensitive controls are necessary. The tentative conclusion can, therefore, be drawn that, among the various types of rolling mills, continuous hot and cold mills are of high relative costs in the Bloc.

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Appendix V: Shipbuilding

Widely scattered information relating to the cost of production of a few ocean-going and harbor craft in the USSR, together with qualitative information about the nature of shipbuilding operations in the Soviet Union, suggest that shipbuilding is an industry of average relative costs in the Bloc as compared with the West.

The fact that the USSR has been importing vessels from the West despite being able to produce ships efficiently is a matter that is unexplained.

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Appendix I: Borax

Borax appears to be a commodity with very high production costs in the bloc as compared with the West. The extremely high ruble-dollar ratio for borax (64:1) compared with a boric acid ratio (10:1) about equal to the average for commodity production may reflect a difference in production practices between the USSR and the US. The only method of borax manufacture known to be used in the USSR consists of first producing boric acid from the boron-containing minerals and then reacting the boric acid with soda to produce borax. This method is significantly more costly than the more common method (typically used in the US) which involves dissolution of the ore in hot water or steam, evaporation, and then fractional distillation.

To the extent that the method of producing boric acid first and deriving the borax as a later process is used in the USSR, it may reflect one or more of the following situations:

1. Borax is a sodium borate, therefore, if boron mineral resources do not contain sodium, borax cannot be obtained from them without the addition of sodium at some stage of the processing. Possibly some of the Soviet ores do not contain sodium, in which case it might be more economical to make boric acid at some point close to the mineral deposits and transport it to a point convenient to sodium availability, especially if this were also near to the point at which the borax were to be used rather than to ship the sodium in and the borax out in order to be able to use the cheaper method of borax extraction at the mine.

2. If, for any reason at all, any particular method were put into operation, it might be more economical to continue it than to start a new method, because of the great cost of setting up a chemical processing establishment.

3. It has also been suggested that if Soviet technologists have been unable to successfully apply the techniques of "phase-rule" engineering, they may have been hampered in their application of the cheaper methods of producing borax.

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